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XIII

EXPEDITION TO GUADALUPE ISLAND, MEXICO, IN 1922[1]

THE BIRDS AND MAMMALS

BY

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The "Tecate" sailed from San Diego, July 9, touching at Ensenada the same day to pick up several of the Mexican members of the party. From that port it sailed direct to Guadalupe Island which was circumnavigated. A week was devoted to that island, including two trips to the top and pine belt at the north end. From Guadalupe the vessel returned for fuel to San Quintin, where three days were spent making investigations before proceeding to Magdalena Bay and return, touching at all the coast islands en route with the exception of San Geronimo, as well as collecting to a limited extent at several mainland points. The expedition returned to San Diego, August 16, having sailed over 1,400 miles.

Owing to the season, the collections of birds were quite unsatisfactory, all species being in moulting condition. However, the expedition served as a reconnoissance to enable us to plan for further work in the future.

As there have been but few papers treating of the insular life of Lower California, a brief sketch of the islands in their relation to the mainland may be of interest. With the exception of Guadalupe, all the islands of that part of the coast have

[1] This is paper No. 2 of the *Tecate* Expedition. No. 1, the Narrative, gives a complete itinerary. See this volume, pp. 217-275.

at some time been a part of the mainland. All but the above exception lie at no great distance off shore and the water between is of a depth indicating a somewhat recent separation. At all points from San Quintin south to Magdalena Bay, including both islands and mainland, is found abundant evidence of a recent uprising of from 20 to 30 feet above the present sea level. In his paper on the geology of this section, Dr. Hanna will treat this subject in full.

Land mammals are found on all of the islands with the exception of Guadalupe and the Benitos. The first mentioned has neither reptiles nor mammals, except introduced mice, goats and cats, while the Benitos boast one species of lizard. Cedros, lying 15 miles from nearest points of the mainland, is the largest island, save those bordering Magdalena Bay on the west, which are so nearly a part of the mainland as to bar them from the brotherhood of islands. Viscaino, in 1602, visited Cedros, and he, with other explorers of this early day, mentions rabbits as "black as jet with fur softer than a beaver's." They must have been well bleached since that day, and have been ever since I have known them. Some of the early Spanish explorers also credit Cedros with a considerable population of "bold Indians." So far as present records go, there is no evidence of this or other coast islands south of the Coronados ever having been inhabited by Indians.

At an early date a coast whaler left goats on Guadalupe and Cedros, with the evident intent of securing a supply of fresh meat. Though Cedros seems to be better suited than Guadalupe for the requirements of a reasonable goat, they never seem to have become overly abundant on that island. Guadalupe, however, has been for many years so overstocked, despite the thousands that have been killed, that the entire floral life of the island is doomed. Many species of plants, and some genera peculiar to the island, have been entirely exterminated, and not even a pine, oak or palm can look down upon a seedling to replace the aged trees now beginning to fall. A sprout of any kind is nipped as soon as it is above the soil. It is estimated that a goat census of Guadalupe would show from 30,000 to 50,000 animals. As long ago as 1887, when the present writer first became acquainted with the islands, 15,000 goat skins per

annum were being exported without causing any noticeable difference in the herds. Since that day, many concessionaires have attempted the business and failed, owing to the slight difference between the cost of skins and the selling price on the mainland.

If the goats have been busy in reducing the floral list of the island, the cats that were introduced at some time in the past have lost no time in exterminating the birds. At this date all of the land species have been reduced to no better than ten per cent of their abundance in 1887, and several have entirely disappeared. For several years past there have been no records of the Guadalupe Caracara, flicker, towhee or wren *(Thryomanes brevicauda)*, and they no doubt are totally extinct. Kinglets and crossbills, formerly plentiful in the pines at the north end of the island, were not found by us, and they quite likely belong to the list of those destroyed by cats. The end of all the land species of the islands, with the exception of such as *Buteo borealis calurus,* is a matter of but a few years. Within the past 25 years the fishermen of the Lower California coast, chiefly Japanese, have introduced cats on every island north of Magdalena Bay, and the effect is noticeable at this early day.

Upon the San Benito Islands, the land birds, abundant but a few years ago, have almost disappeared. At the time I last called at these islands in 1898, one might easily have collected a dozen *Carpodacus mcgregori* in an hour. In August of the current year, four of our party for two days made this species a special object, with the result that one was secured and another seen. Petrels and other small water birds have also suffered heavily on Guadalupe, and unless there may be some other as yet undiscovered nesting ground of the Guadalupe Petrel it will soon be extinct. The only known colony at the north end of Guadalupe seems to be entirely destroyed. A few birds seem to have been nesting in the cliffs, and if such colonies are sufficiently extensive the species may endure for several years.

The present list of birds and mammals is of species seen and mostly collected, but one or two are included on evidence furnished by others; the source of such data is mentioned in the text. Many species not mentioned are known to occur

within the limits of the region covered, but after an absence of a quarter of a century, I am in doubt as to their present status and will leave them for future investigation.

List of Species of Birds

1. **Ptychoramphus aleuticus.** Cassin's Auklet

This species was quite common at all seasons as far south as 28 degrees, at least. At the time of our visit, all had abandoned their nesting grounds and were at sea. Nowhere did we see flocks of more than five or six—more often single birds or pairs. Two specimens in badly worn plumage were taken at Guadalupe.

2. **Brachyramphus hypoleucus.** Xantus's Murrelet

This species was in badly worn plumage and several of the birds seen at sea seemed unable to leave the water. They were not uncommon as far south as Magdalena, but none was found on land. In digging for eggs of Oceanodroma at San Benito Island, August 12, a downy *O. monorhis* was found in a burrow with an addled egg of the Murrelet. I have never found this species nesting in a burrow of this nature, the many eggs that I have taken in the past being either among the rocks or under overhanging curtains of thick grass or other vegetation. In either situation, subdued daylight reached the brooding bird. I am inclined to think this Murrelet pairs for life, as it is quite the rule to find either a pair of birds or at most two pairs in company.

3. **Stercorarius parasiticus.** Parasitic Jaeger

This species is not uncommon along the coast covered, but is not often seen as early as August. On July 31 three or four were noted south of Abreojos Point, Lat. 26° 40′ N. They were not seen again.

4. **Larus occidentalis.** Western Gull

The dominant species of the genus, and the only one nesting at present in the region under discussion. About Guadalupe Island a few were seen, July 11 to 17, with young not yet on

the wing. There seemed to be only a scattering few gulls about this off-shore island, as not over 10 to 12 pairs were seen at any one spot. On all other islands they are more or less abundant as far as Magdalena Bay. Young, but a short time from the egg, were seen as late as the first of August, and these belated broods may perhaps be due to the rookeries being raided earlier in the season by fishermen, who take the eggs as long as they can be found in an edible condition.

5. **Larus heermanni.** Heermann's Gull

On the voyage south, this species was not seen until we reached San Quintin Bay, July 18, where a dozen in juvenile plumage were noted. They were seen sparingly south to Magdalena Bay, and on August 2 at San Roque Island a flock of about 1,000 were met with, mostly immature birds. Formerly there was a nesting colony on this island, but from indications I would say it has been destroyed by the resident fishermen. From notes furnished me by those who have recently visited the nesting grounds of this gull in the Gulf of California, I do not hesitate to state that unless protection is offered at once the species will soon be extinct. Large colonies are still found nesting on the islands to the west of Guaymas, but boats from that port haunt the nesting grounds as long as there is any chance of securing one more egg, and the egg that hatched has been the rare exception. A few years ago this was one of our common gulls along the coast of California, as far north as Santa Barbara. At all seasons of the year a few at least might be depended upon to be found along the kelp beds outside the harbor of San Diego. During the past six years only one has been noted. A few seen on the rocks at La Jolla, fifteen miles north of San Diego, the past year are all that I have any record of.

6. **Xema sabini.** Sabine's Gull(?)

Off Abreojos Point, July 31, we met with large flocks of shearwaters and elegant terns feeding on the very abundant fry. With the thousands of the above species were several small gulls that filled the requirements for this species better than any other. Owing to their distance from the boat, positive

identification was impossible. We again fell in with 25 or more of the same species off Todos Santos Islands, August 15, under exactly similar conditions.

7. **Sterna maxima.** Royal Tern

Formerly this species, like the Heermann's Gull, was abundant all along the coast of southern and Lower California. They were seen at San Quintin Bay and Cedros Island during our voyage in July and August, but only in very small numbers. I can only attribute their scarcity to the fact that the fishermen have raided the nesting grounds to such an extent that the species is becoming rare on this coast.

8. **Sterna elegans.** Elegant Tern

The elegant tern was seen at several stations from San Quintin south to Magdalena Bay, but like the royal, there were but few compared to their former abundance. At Abreojos Point, however, on July 31, we found a large mixed flock of sea birds feeding on sardines. Ninety-eight per cent of the flock—estimated to be 25,000 birds—was of this species, with young of the year predominating. I have been told that formerly there was a large nesting colony of this species on San Roque or Asuncion Island, but that the constant persecution had driven them away. As all of the islands along this coast for 500 miles are used as permanent fishing camps during the entire nesting season, and as the Japanese and Austrians composing the personnel of these stations depend on eggs for their table, so long as any are to be found, there would seem to be small chance for any of the gulls and terns. If the toll of eggs exacted by the fisherman was the sum total paid, the damage might be safely disregarded, but as will be instantly recognized by any who have visited an island where gulls are to be found, and terns or cormorants are nesting, the real slaughter begins when man, followed by a cloud of screaming gulls, drives the nesting birds from their eggs or young. The gulls, pouncing down on the undefended nests, destroy eggs or young by thousands, and a frequent disturbance of this nature, even though no eggs are taken by the fishermen, will naturally destroy the species.

9. **Sterna forsteri.** Forster's Tern

A few of this species were seen with the last mentioned at Abreojos Point, also a few at San Quintin Bay on August 14, the vanguard of the fall migration.

10. **Sterna antillarum.** Least Tern

At Abreojos Point there were half a dozen of the least terns fishing in the shallow water inside the surf line. They did not seem to care for the company of the thousands of their larger cousins and the deeper waters.

11. **Chlidonias nigra surinamensis.** Black Tern

One or two of the black terns were seen with the large flock of elegant terns at Abreojos, and a day or two later a few along the kelp beds 100 miles north. This species is not uncommon during the fall migrations about the kelp beds of the entire coast, but does not seem to linger long.

12. **Diomedea nigripes.** Black-footed Albatross

This species seems to be far less common along the southern coast than it was 25 years ago. On our cruise to Magdalena Bay none was seen until we neared Guadalupe Island, July 11, when two were picked up at daybreak and followed the ship until we reached the island. They were seen sparingly as far south as between 25° and 26°. Formerly I found the short-tailed albatross *(D. albatrus)* equally common and over the same range as *nigripes,* but none was seen the past summer, nor have I seen during the past two years an albatross of either species between Point Loma and the Coronado Islands, where they were formerly of regular occurrence, though I have visited these islands perhaps 20 times within the time mentioned. The raids made by the Japanese on the nesting colonies between Hawaii and Japan no doubt account for the present scarcity of birds along our coast.

13. **Fulmarus glacialis.** Fulmar

The skull of a fulmar was picked up on the beach at the south end of Cedros Island. While fulmars are more or less common during the winter months along this coast, we were too early to meet with them.

14. **Puffinus creatopus.** Pink-footed Shearwater

This species was found more or less abundant all along the coast and for 50 miles or more at sea. Their presence seemed, as with all of the other shearwaters, to depend entirely on the small fish on which they feed. At several points along the shore flocks of many thousands of shearwaters were seen. Always such flocks were composed of the several species of Puffinus found on this coast, with a sprinkling of gulls, cormorants and pelicans.

15. **Puffinus opisthomelas.** Black-vented Shearwater

Generally distributed over the entire region covered by the expedition and by far more abundant near Natividad Island, where the largest known nesting colonies are found. On August 4th, Dr. Hanna and the writer opened 25 or more burrows, with the result that four birds were secured, one being a juvenile, showing but little of the natal down, otherwise the plumage was not to be distinguished from the adults. From the tracks about the burrows I think that the birds visited the nests each night, though for what reason after the young had departed, would be hard to say. On a former visit to Natividad, in September, I found fresh tracks about the entrances of the burrows, but did not succeed in taking any birds, though many nests were opened. Fresh eggs in abundance have been found in the Natividad colonies in April, the birds beginning to occupy the burrows some weeks earlier but at just what date we have, as yet, no records, but it is evident that at least five months are spent in the region of the breeding grounds. On Natividad, as at Guadalupe and the San Benitos where this species nests to some extent, the introduced cats have killed many adult birds. As cats have been recorded on all of the known nesting islands of the species, it would seem

to be only a matter of time until the shearwater will be extinct. On two or three occasions shearwaters, the size of *opisthomelas,* were seen that were ashy gray above and below but otherwise similar to that species. No specimens having been secured it is not safe to venture at identification.

16. **Puffinus griseus.** Sooty Shearwater

The notes on *P. creatopus* will apply to this species as well. They were quite common wherever large flocks of shearwaters were met with, which was whenever we encountered schools of small fish.

17. **Puffinus bulleri.** New Zealand Shearwater

The positive identification of a shearwater at gunshot range is somewhat of a venture and as no specimens of this species were obtained it might seem dangerous to include the species among those noted. However, a large Puffinus with pure white underparts and other characters assigned to *bulleri* was frequently seen between Ensenada and Magdalena Bay, and I have little doubt as to its being this species. In April, 1897, I met with similar birds as far south as Cape St. Lucas. At that time they all seemed to be flying north in either quite small, scattered flocks or singly. None was taken, but I then, as now, would unhesitatingly pronounce them *bulleri.* If it is not this species it is probably *P. chlororhynchus.*

18. **Halocyptena microsoma.** Least Petrel

This diminutive petrel was not noted until we were nearly at Magdalena Bay, when a few were seen at sea (July 24). They were inconspicuous at all times, owing, perhaps, to the fact that it was their nesting season and only the non-breeders might be expected at any distance from the San Benito Islands, which is their only breeding ground so far recorded. On these islands we found them abundant, August 12, at which date we took fresh eggs and downy young, the last a ball of down, smoky black in color. So far as my experience goes,

the least petrel does not nest in a burrow in the ground as do the different species of Oceanodroma with which I am familiar. Of the many nests I have seen, all were in bare rocky slides, or similar localities in the rocks, where subdued light might reach the bird.

19. **Oceanodroma leucorhoa kaedingi.** Kaeding's Petrel

While the *Tecate* lay at anchor at the north anchorage at Guadalupe, July 11-16, this species was quite in evidence, evidently nesting in the high lava cliffs that almost overhung the beach. Soon after nightfall their calls might be heard, as those birds that had spent the day at sea came in to land. After 11 p. m. there was comparative quiet until just before daybreak, when for a short time the calling began once more, to cease entirely at dawn. The lights of the vessel attracted a number of birds aboard and these constitute the only specimens taken, except a juvenile about a week old that was taken from a crevice in the lava. This specimen, No. 25561, California Academy of Sciences, is nearly uniform sooty gray, slightly lighter below. A few petrels that were considered *kaedingi* were seen at sea as far south as Ballenas Bay, but they were by no means common even in the region of their nesting grounds on Guadalupe. Dead bodies of this species were found impaled on the needle-like spines of the "cholla" cactus which is quite common on many parts of Guadalupe, the bird evidently having flown into the death trap in the dark. Cats also have taken a large toll, as is attested by the many half-eaten bodies in many parts of the island.

20. **Oceanodroma macrodactyla.** Guadalupe Petrel

Guadalupe Island is, so far, the only recorded habitat of this species. In my several visits to this island I have never seen the bird except as I took them from the nesting burrows. They nest far earlier than the other species of the genus, half-grown young being found as early as May 25, while August would produce young of *O. melania* of similar size. It is, of course, highly probable that the species leaves the island at the end of

the nesting season, but its whereabouts during that part of the year when it is not at home at Guadalupe still remains a mystery. In former years there was a considerable colony along the ridge in the pine growth at the north end of the island. The present writer visited this spot May 26, 1892, and found the birds abundant. In July of the current year the same ridge was explored and but little was seen to indicate a recent occupation of the nesting ground. A few burrows were seen, but they seemed to be very old. In 1892 dozens of dead birds were seen, where cats had torn away the breast, leaving wings and tail, enough to identify the species. Half a dozen similar dried bodies were seen last July, but so few that we were of the opinion the colony was about finished.

21. **Oceanodroma melania.** Black Petrel

This species was seen more or less commonly from the time we left San Diego until we returned, but was rare; nor was it seen at all far from shore. Nests are not uncommon on the Coronado Islands, but on the San Benito Islands are perhaps the largest breeding grounds of the species so far discovered. August 12, we found many nesting birds with eggs fresh to hatching as well as half-grown young. The nests were usually at the end of a crooked burrow, some two and one-half feet to four feet from the entrance, though a few were found in loose, shelly rock slides. This and the other species of the genus found on the coast might select a similar location and often do, but this is more often in stygian darkness at the end of a three-foot burrow. This species, in common with the other smaller birds of the Benitos, has suffered heavily from the introduced cats.

22. **Oceanodroma monorhis.** Swinhoe's Fork-tailed Petrel

It is with considerable hesitation that I attempt a classification of this group. *O. "socorroensis"* has in the past been the accepted species, being more or less common from the Coronado Islands to the San Benitos during the nesting season. I cannot say at this writing just how many times in the past I

have taken from the same nesting burrow white-rumped *"socorroensis"* and equally typical *"monorhis"* with no white at all, but if I were to trust to memory, I would say that that was as often the case as otherwise. I have before me birds from the Coronado Islands as well as from the Benitos that agree exactly with the descriptions and measurements of *monorhis,* and that were from the same colonies as white-rumped birds or those with white flanks. Unfortunately the collectors neglected to so mark the specimens as to enable one to separate the "pairs" where two birds were found in the same burrow. A large series of petrels, from either of the above localities, shows that one might by selection separate several species or races were it not for the troublesome intergrades. Birds with pure white rumps, those with white flanks and every form of gradation to sooty-black and typical *monorhis* can be selected. At this writing, and in the light of the material before me, it might seem the safer course to sidestep the issue and leave the decision to further developmnts. Letters, however, from W. E. Clyde Todd, of the Carnegie Museum at Pittsburgh, and Mr. A. J. Van Rossem, of Pasadena, California, both of whom have access to large series of the *"socorroensis—monorhis"* group would indicate that there was but a single species represented with a wide variation in the plumage of the rump. At San Benito Island we found the birds nesting August 12, and secured fresh eggs as well as young a week or more from the egg. We saw the species at sea as far south as Magdalena Bay, where, on July 27, a few were seen inside the entrance of the bay in company with *O. melania.*

23. **Phalacrocorax auritus albociliatus.** Farallon Cormorant

Seen more or less commonly as far as Magdalena Bay, but very largely replaced by the following species south of Abreojos Point. During the first half of August this species, in common with the Brandt's, was found nesting on all of the islands north of 27°. Fresh eggs, those far advanced in incubation, and from that to young on the wing, was the status of all the rookeries visited as late as August 13. I think the lack of uniformity may be accounted for by the destruction of

the eggs by western gulls. The two species of cormorants breeding along this coast are more extensively preyed upon by the gulls than any other species and should the cormorants be driven from the nests, eggs and young by the hundreds are immediately destroyed. As has been noted earlier in this paper, all of the islands are used, during a great part of the year, by fishermen, who undoubtedly cause a very disturbed condition, innocently or otherwise. They are the indirect cause of the destruction of many thousands of cormorants as well as other sea birds. The Farallon cormorants were always found occupying the higher and more precipitous parts of the islands, leaving to the following species the gentle slopes and level land.

24. **Phalacrocorax penicillatus.** Brandt's Cormorant

Much more abundant than the preceding species. Despite the disturbed condition of the nesting grounds, there were large rookeries on most of the islands visited. On the more level parts of San Roque and Asuncion were several large rookeries that at the time of our visit were occupied by hundreds of young, ranging from those able to fly to squabs but just hatched. As one approached the nesting grounds, the young crowded toward the side farthest removed from the intruder, until it seemed as if it would be impossible to introduce another bird into the interior without the aid of a wedge, so tightly were they massed. As the danger became more evident, the compact raft moved faster, the older birds in the lead progressing by a series of awkward hops which soon left the younger members behind. As more speed seemed desirable the wings were called upon, waved about like flails, and so upset the balance that immediately the youngster that was merely in a slow hurry at best was thrown forward on his face and quite as often as otherwise stepped on his own neck and was unable to get up. If crowded, the half-grown young will take to the water and escape by swimming, though many times such birds are unable to regain the nesting ground owing to the low cliffs bordering the sea below the rookeries. The fate of such birds is somewhat doubtful, as they are as yet unable to secure their own food.

September 5, 1925

25. **Pelecanus californicus.** California Brown Pelican

An abundant species along shore throughout the trip, but rare in deeper waters. A single immature bird seen at Guadalupe is my only off-shore record. At Magdalena Bay they were noticeably more abundant than at any point north. At many of the islands, notably San Roque and Asuncion, we found fresh eggs and newly hatched young, as well as birds on the wing. As only a single brood is raised and young are to be found in late February or early March, the late nesting can only be explained on the ground of reported disturbances, as noted under species above mentioned.

26. **Fregata aquila.** Man-o'-war-bird

Very abundant south of 26°. This species formerly nested extensively in the mangrove swamps about Magdalena Bay, but repeated raids on the part of the natives who use the eggs for food have reduced their numbers. Owing to the nature of the mangrove growth, it is quite difficult to reach the nests, which fact has been the only restraining influence in preserving the nesting grounds in this region.

27. **Oidemia perspicillata.** Surf Scoter

A few only seen in San Quintin Bay—non-breeding birds, no doubt, that did not migrate. Such cases are common. During the winter the species is very abundant all along the coast.

28. **Erismatura jamaicensis.** Ruddy Duck

A single bird in San Quintin Bay is the only record for the voyage.

29. **Guara alba.** White Ibis

Seen only in the mangroves at Magdalena Bay, where it was not very abundant. As the more remote parts of the jungle north of the settlement were not visited, it may be that the species was less rare than our observations would indicate.

30. **Ardea herodias sanctilucæ.** Espiritu Santo Heron

Not uncommon on the islands near shore and at most, if not all, of the mainland stations. Two or three were seen at Guadalupe Island.

31. **Hydranassa tricolor ruficollis.** Louisiana Heron

Seen only in the mangroves about Magdalena Bay, where it was common. Formerly I have taken specimens as far north as San Quintin, but I think it was never abundant there.

32. **Butorides virescens frazari.** Frazar's Green Heron

Found not uncommonly at Magdalena Bay, where they shared the mangrove thickets with the above species.

33. **Nyctanassa violacea.** Yellow-crowned Night Heron

A single specimen shot on a reef at San Benito Islands is the only record.

34. **Rallus beldingi.** Belding's Rail

None seen, but the frequent notes of Rallus heard in the mangroves at Magdalena Bay leave little doubt as to the species and its abundance.

35. **Phalaropus fulicarius.** Red Phalarope

The first of the migrating phalaropes were noted July 11, when two were seen between Ensenada and Guadalupe Island. After that date they rapidly increased in abundance until the 18th, when they seemed to be in full force. They were not seen over 50 miles off shore.

36. **Lobipes lobatus.** Northern Phalarope

Seen but once, August 2, off San Roque Island.

37. **Pisobia minutilla.** Least Sandpiper

38. **Ereunetes mauri.** Western Sandpiper

On July 26, a small flock of "sand peeps" was seen on a mudbar in the mangroves of Magdalena Bay. None was shot and positive identification was difficult. The two species usually migrate in company and it is quite probable that the flock was composed of both species. A week later we met with them migrating and in early August they were seen at all of our anchorages north of Magdalena.

39. **Limosa fedoa.** Marbled Godwit

A few were seen at San Quintin on July 21. They occur sparingly all summer in all of the suitable localities from Magdalena Bay north, the summer residents being non-breeding birds that have failed for some reason to follow the migration north.

40. **Totanus melanoleucus.** Greater Yellow-legs

Two were seen on a mudbar in the mangroves at Magdalena Bay, July 26. The one secured was in fair summer plumage.

41. **Catoptrophorus semipalmatus inornatus.** Western Willet

First seen at Abreojos Point, July 31, in a company of mixed shore-birds, evidently the first of the migrants. Quite common at San Quintin, August 14.

42. **Heteroscelus incanus.** Wandering Tattler

First seen at Guadalupe Island, July 11. While not common at this island, they were frequently seen along its rocky shores. The same may also be said of all the islands visited. Although found at all seasons of the year, those that linger through the summer are probably not nesting birds. I have found downy young seeking cover under the overhanging edges of glaciers

of the Seward Peninsula in Alaska, conditions hardly in keeping with those of the sun-scorched shores of the Lower California islands.

43. **Actitis macularia.** Spotted Sandpiper

First seen at Magdalena Bay in company with greater yellow-legs, July 26, after which they were seen at any suitable location north to San Martin Island. This species is rather common along the islands and coast of Lower California during the winter months, inhabiting rocky broken beaches in company with its larger relative, the wandering tattler. They, like the last, are seldom seen in companies of more than three or four, more often singly or in pairs.

44. **Numenius americanus.** Long-billed Curlew

Seen at San Quintin, July 18. Not uncommon at that point where, like the marbled godwit, it is a left-over from the spring migration.

45. **Numenius hudsonicus.** Hudsonian Curlew

A few found along the ocean beaches all summer, being like the above, non-breeders. This species seems to prefer the clean sands of the open beach and is not often seen on the mud-flats of the bays, where the long-bills thrive. A small flock of *hudsonicus* was seen at the entrance of San Quintin Bay, July 14.

46. **Squatarola squatarola cynosuræ.** Black-bellied Plover

A few seen among the migrating shore-birds at Abreojos Point, July 31, the first to arrive from their summer home.

47. **Oxyechus vociferus.** Killdeer

One or two noted near the settlement at the mouth of Santo Domingo Cañon, fifteen miles north of San Quintin. The species is resident in such localities, where freshwater furnishes congenial surroundings.

48. **Charadrius semipalmatus.** Semipalmated Plover

A small flock seen at Magdalena Bay, July 27.

49. **Charadrius nivosus.** Snowy Plover

A small flock seen on the beach at Abreojos Point.

50. **Arenaria interpres morinella.** Ruddy Turnstone

A flock seen at Abreojos Point. The single bird that was secured was in almost full nesting plumage.

51. **Arenaria melanocephala.** Black Turnstone

Rather common at Abreojos Point, July 31, after which it was seen on all the rocky beaches north to San Martin Island. Two were seen at Guadalupe, July 16.

52. **Hæmatopus frazari.** Frazar's Oystercatcher

Seen on all the rocky shores from the south end of Magdalena Bay north. Often seen in company with *bachmani* to which it offers a striking contrast.

53. **Hæmatopus bachmani.** Black Oystercatcher

Not seen south of Asuncion Island, where it was common. From that point north it was common on all suitable beaches.

54. **Lophortyx californica vallicola.** Valley Quail

Common in the section east of San Quintin which is the only spot visited that was suited to its requirements.

55. **Zenaidura macroura marginella.**

Western Mourning Dove

Found breeding on Cedros Island, July 22, when young just from the nest were seen.

56. **Cathartes aura septentrionalis.** Turkey Vulture

Quite common at any of the larger islands except Guadalupe and as far as Margarita Island at the southern end of Magdalena Bay.

57. **Parabuteo unicinctus harrisi.** Harris's Hawk

Seen but once, near San Quintin, where the species is not uncommon along the timbered cañons east of that point.

58. **Buteo borealis calurus.** Western Red-tail

Several were seen on Guadalupe Island and one specimen taken.

59. **Falco peregrinus anatum.** Duck Hawk

Formerly quite common, nesting on all of the islands north of Magdalena. Few were seen, however, on the voyage of the *Tecate,* due, perhaps, to the season being that when the birds might be expected to be scattered far from their nesting haunts. A fine specimen was taken on San Benito, August 13.

60. **Polyborus cheriway.** Audubon's Caracara

Seen only at Margarita Island, where it was seemingly rare. There is little doubt but the Guadalupe Caracara is extinct; no signs of it could be found by members of our party, nor have any who have visited the island during the past 20 years reported living birds.

61. **Pandion haliaëtus carolinensis.** Osprey

First seen at Guadalupe Island, where a specimen was secured. Quite common at Cedros Island and most of the stations visited. On Margarita Island there are dozens of nests built on tops, or on projecting limbs, of the giant cactus.

62. **Speotyto cunicularia hypogæa.** Burrowing Owl

Seen only at San Quintin. The burrowing owl was formerly found on the San Benitos, Natividad and other islands of the coast, where it was resident. It is possible that it has been exterminated by the cats.

63. **Geococcyx californianus.** Roadrunner

Seen only at San Quintin.

64. **Dryobates scalaris lucasanus.** San Lucas Woodpecker

This species was common, feeding on the ripe fruit of the giant cactus, on Margarita Island. Not met with elsewhere.

65. **Centurus uropygialis brewsteri.** Brewster's Woodpecker

A rather abundant species in the giant cactus growth on the west side of Margarita Island, where it was feeding on the ripe fruit of the cactus. All the specimens taken were in badly worn plumage, but indicate a strongly marked race.

66. **Chordeiles acutipennis inferior.** Texas Nighthawk

A few seen at Magdalena Bay and on Margarita Island. The single specimen taken (No. 25530 C.A.C.) agrees fairly well with skins before me, from southern California, except that it is slightly smaller.

67. **Aëronautes melanoleucus.** White-throated Swift

On the southeast side of Guadalupe Island we saw a number of these swifts cruising about the cliffs overhanging the sea. It was near this same spot that I found, in May, 1892, a nest but so far back in a crevice in the lava that without tools to enlarge the opening it could not be reached, though the sticks composing the structure could be plainly seen. On July 19 I saw several swifts in company with cliff swallows flying about a cliff at the mouth of the Santo Domingo Cañon, 15 miles

north of San Quintin. Several years ago I saw this species entering abandoned woodpecker holes in the giant cactus near San Fernando, about 75 miles south of San Quintin.

68. **Calypte anna.** Anna's Hummingbird

At the north landing on Guadalupe Island we saw a hummer in female plumage that seemed to be this species. It escaped, however, leaving its identity in doubt. W. E. Bryant recorded the species from the island many years ago.

69. **Calypte costæ.** Costa's Hummingbird

This species seemed to be the only one we met with at Magdalena Bay and Margarita Island, where several were taken in late July. Specimens were secured also at Cedros Island.

70. **Myiarchus cinerascens pertinax.**

Lower California Flycatcher

Flycatchers of the ash-throated group were seen several times on Margarita Island, but no specimens taken. I supposed them to belong to this subspecies.

71. **Sayornis sayus.** Say's Flycatcher

Common about San Quintin. On Cedros Island it was seen several times. A young male (No. 25531, C.A.S., August 8, south end Cedros Island) is somewhat darker above than specimens of similar age from southern California, with slightly narrower bill. The difference may be individual, however.

72. **Sayornis nigricans.** Black Phœbe

Seen only in the Santo Domingo Cañon near San Quintin.

73. **Otocoris alpestris actia.** California Horned Lark

The Otocoris of San Quintin. I refer to this form with some hesitation, as no additional specimens are at hand, a single juvenile in the collection of the Academy being the only

bird taken. At Abreojos Point a small flock of horned larks was seen and three badly worn and juvenile specimens secured. They seem very small and can hardly be reconciled to any of the recognized races, they being, I suppose, *enertera* Oberholser.

74. **Aphelocoma californica hypoleuca.** Xantus's Jay

A rather common inhabitant of the mangrove swamps north of the anchorage at Magdalena Bay. Not seen elsewhere.

75. **Corvus covax sinuatus.** Raven

A common species throughout the trip. Seen at every station except at Guadalupe.

76. **Carpodacus mexicanus frontalis.** House Finch

Common at San Quintin and at the nearby mission of Santo Domingo.

77. **Carpodacus amplus.** Guadalupe House Finch

Formerly one of the most abundant land birds on the island but now reduced to about 10% of its abundance 25 years ago, the destruction being due to the thousands of cats that infest all parts of the island. The species nests largely in the cactus found over most parts of the island, which fact saves the nestlings until able to flutter to the ground, where they fall an easy prey.

78. **Carpodacus mexicanus clementis.**

San Clemente House Finch

Common on Cedros Island. Five specimens were obtained.

79. **Carpodacus mcgregori.** McGregor's House Finch

A quarter of a century ago this was one of the few land species that was common on the San Benito Islands. Today they are so nearly extinct that I doubt another specimen being

taken for science. Like the last mentioned species, they have fallen victims to the cats. A single specimen was all we had to show for four guns in two days. A second specimen was reported as seen.

80. **Astragalinus praltria hesperophilus.**

Green-backed Goldfinch

Two females taken at the south end of Cedros Island. They seemed to be nesting in small numbers on this part of the island. Those taken are somewhat smaller than typical specimens from southern California, but whether the difference is constant will remain for further specimens to determine.

81. **Passerculus beldingi.** Belding Sparrow

Seen only at San Quintin, where it is common in the salt marsh.

82. **Passerculus rostratus rostratus.** Large-billed Sparrow

This species winters on all of the islands, I think, except Guadalupe, and had just begun to make its appearance when we noted a few along the beaches at the north end of Cedros, August 9. A single specimen was taken on San Martin Island, August 14.

83. **Passerculus rostratus guttatus.** San Lucas Sparrow

A few noted in the mangrove swamps of Magdalena Bay, and a single specimen taken July 26.

84. **Passerculus rostratus sanctorum.** San Benito Sparrow

Found only on the three islands of the San Benito group, where they are still common but greatly reduced from their former abundance. The cats are again to be given the credit.

85. **Junco insularis.** Guadalupe Junco

Becoming rare on the island, though it was at one time the most abundant species.

86. **Amphispiza bilineata deserticola.** Desert Sparrow

Common at San Quintin, Cedros and Magdalena Bay region.

87. **Amphispiza belli.** Bell's Sparrow

Common at San Quintin and San Martin Island.

88. **Pipilo crissalis senicula.** Anthony's Towhee

Common in the hills east of San Quintin. A full-fledged young was taken at the Santo Domingo Mission, July 19.

89. **Cardinalis cardinalis igneus.** San Lucas Cardinal

Rather common at "The Ranch" six miles west of the landing at Margarita Island, where the dense thickets offered congenial surroundings. Very shy and difficult to secure, one specimen only being taken.

90. **Petrochelidon lunifrons lunifrons.** Cliff Swallow

Common and nesting under the eaves of the houses at San Quintin, where nestlings were seen, July 20. On the same date a large flock was seen circulating about the face of a cliff at the mouth of the Santo Domingo Cañon. A small flock, doubtless migrating, was noted flying over the mangroves at Magdalena Bay, July 26.

List of Species of Mammals

In the following list of mammals the nomenclature of Miller's "List of North American Land Mammals in the United States National Museum" has been followed.

As the series of Lower California mammals in the collections of the San Diego Museum of Natural History and the California Academy of Sciences are very incomplete, I have been obliged to depend in many instances on the collections in the U. S. Bureau of Biological Survey and the American Museum of Natural History, New York. My thanks are due Dr. E. W. Nelson and H. E. Anthony for comparison of several species with the types.

1. **Balænoptera physalus.** Pacific Finback Whale

Whales were often seen along the coast and about all of the islands with the exception of Guadalupe. They were nowhere common, and all that were identified with reasonable certainty were of this species. It is quite probable, however, that some seen were humpbacks.

The larger cetaceans are more abundant during the winter months in the region covered by this paper, but they were formerly far more abundant than today. In the past, when the fall migration was at its best (November) I have seen more whales in one school than were seen during the entire southern voyage. At the time mentioned, 25 years ago, the California Gray *(Rhachianectes glaucus)* was the most common species and was daily seen along shore, often inside the kelp beds, within half a mile of the beach. During the past two years I have seen just two of this species and had reports of two more, while the Sulphur Bottom *(Sibbaldius sulfureus),* formerly quite common, has not been seen at all. The modern method of whaling has sounded the death knell. Commercial whaling is about a thing of the past and, unless something is done soon toward protecting them, several species will soon become commercially, if not actually, extinct on this coast.

Nearly all of the whales seen during the voyage of the *Tecate* were close in-shore, frequently at the edge of extensive kelp beds and, as they were usually seen in pairs, it is not un-

likely that they were mating. In late July and early August, there was a very extensive run of sardines along the entire coast and, as these small fishes furnish many of our *Balænidæ* with a large part of their feed, that may account for the entire absence of whales in deep water and their presence along the shores where the sardines abounded.

During the winter of 1920-21, a steam whaler established a station in Magdalena Bay and spent several months at that point. From the bones still to be seen on the beach, they must have killed several whales but, as they never repeated the venture, it is quite probable it was not a commercial success.

2. **Orcinus ater.** Black Killer

Killers were formerly much more common on the Lower California coast than the results of our late voyage would indicate. But one small school of seven or eight was seen several miles off San Quintin, July 18. There is no question but the killers are a bitter enemy of the entire *Balænidæ*. While I have never myself seen the species attack a whale, I have often been told by reliable authority of combats that resulted in the death of the larger "fish." It may be that the present rarity of Orcinus is directly due to the scarcity of whales. The Orca often reaches a size (twenty feet or more) equal to that of a small whale, but whalers never attempt its capture, as it is of little or no value.

3. **Grampus griseus.** Grampus

A single specimen, identified as this species, was seen off San Quintin, July 18. South of Cedros Island there were several times when large porpoises were seen, but under conditions rendering identification impossible. They may have been this species.

4. **Delphinus delphis.** Common Dolphin

On the southwest side of Cedros Island we found a well preserved skull of this species.

5. **Notiosorex crawfordi crawfordi.** Gray Shrew

A specimen taken in the edge of a salt marsh on the west side of San Quintin Bay is not separable from skins from the region of San Diego in the collection of the San Diego Society of Natural History.

6. **Pipistrellus hesperus hesperus.** Western Bat

At the anchorage at Margarita Island we met with a flight of bats at daybreak, July 28. They were seeking shelter in the ledges along the shores. Two were secured and are not to be distinguished from specimens taken at San Diego and the Colorado Desert.

7. **Canis peninsulæ.** Peninsula Coyote

Not uncommon at San Quintin, where one or two were seen. Skulls were secured at Magdalena Bay.

8. **Enhydra lutris nereis.** Southern Sea Otter

Formerly very abundant on the coast of Lower California, as far south at least as Natividad Island. The early records abound in stories of the numbers of sea otter found along this coast where, alas, they were soon exterminated, or at least so reduced that they became almost a myth.

In 1807 the ship *Dromio* from Boston is recorded as trading for 1700 otter skins at Ensenada, then inhabited by a few Indians who must have taken the animals along the kelp beds adjacent to that bay. Capt. Benjamin Morrel in 1825-31 made four voyages to this coast from the Atlantic and mentions "immense numbers of whales, seals, and otters at San Quintin and Cenizas (San Martin) Island."

In 1887 when I first became acquainted with the region of Todos Santos Bay and the former haunts of the sea otter, they were generally considered as extinct. There were, however, a few of the old-time hunters that assured me that in the region of certain kelp beds south of Ensenada there were a few to be found. This, I learned, was true, and a small colony was

established that by now might have been of large commercial importance had it been protected. Unfortunately, it was discovered by certain "beach combers" in 1897, and to the best of my information some 50 were killed. There is a report of 28 being killed eight or nine years later at the same point, but I am unable to authenticate it. That a few still exist, as far south as Cedros, there can be little doubt, as one was killed by a fisherman in 1919, at San Benito Island 15 miles west of Cedros. They were formerly abundant along the kelp beds found along the weather side of Cedros and the Benitos, and in time may be re-established there, if unmolested.

9. **Zalophus californianus.** California Sea Lion

An abundant species on most of the islands visited except Guadalupe, where one rookery of a dozen was found and a few scattered individuals along the shores that might have made the Guadalupe count as much as 50 animals. They were about abandoning the breeding rookeries in August so that a census of the various colonies was out of the question, but from what we found I would place the present count of sea lions, of the coast of Lower California, at fully 150% above what might have been found in 1900. At the last date the species was being persecuted for hides, the rookeries being raided constantly during the season of reproduction. Frequently hundreds of young were left to starve beside the bodies of the slain mothers. At Asuncion Island in 1898, I found a rookery of not over 50. The count at this island in August, 1922, was over 5,000. As San Roque Island, only six miles north of Asuncion, was almost deserted by Zalophus, it is quite probable that Asuncion was being used as a hauling ground for sea lions from both islands.

At Cedros Island there were several large rookeries, but at the time of our visit the animals had begun to scatter and it was not possible to secure a census. I had confidently expected to find at the north end of this island the star sea lion rookery of the coast, as that was its condition in 1898 when it was populated by some 2,000 breeding animals. At the time of our visit, August 9, there were 1,500 Zalophus hauled on the sand

beach at the north bay and some 700 on a beach about two miles south. On the east side of the island two detached rocks formed ideal resorts for sea lions, but we found only 300 at this point. San Benito Islands, where Townsend, in his report of the Albatross Expedition in 1911, mentions finding 1,700 Zalophus, gave us not over 400.

We frequently met with sea lions many miles from the known hauling grounds and far from land, indicating a scattered condition quite different from what would be found in April when a large percentage would be collected on the breeding rookeries. On the Lower California islands the pups are born about June 10, and are about six weeks or two months old before they go into the water, though a young sea lion a week old can and will swim if forced to do so. A baby sea lion spends a large part of its early life in sleep, which is surprisingly difficult to disturb. The present writer has, on several occasions, visited a rookery where the beach was strewn with sleeping pups, seated himself among them and gathered one or two into his lap, and played with them for several minutes before they were sufficiently aroused to realize the true situation. Their surprise was always laughable, as they voiced a horrified baby imitation of daddy's roar and perhaps made a bluff at amputating a human hand or two. A newly-born sea lion is possessed of a full set of needle-like teeth and ample strength to make them serviceable, but, of the many that have by their actions promised to seriously mutilate me, none has yet drawn blood, and such fierce savage beasts have, after a ten-minutes' fondling, refused to be left alone and frequently followed, bawling, along the sand, as if they were losing their best friend.

In this connection might be mentioned an incident in which a sea lion figured, which illustrates the confiding nature of the animal when it is not persecuted. In April, 1922, a seaplane from the North Island Aviation Field made a landing at sea about 30 miles from the Coronado Islands and about the same distance from the mainland. Shortly after the plane came to rest, the pilot heard a scratching on the side of the machine and looking over saw a yearling sea lion investigating the strange craft. The door to the cockpit was held open and the invitation promptly accepted, the seal returning to San Diego by air-

plane. I visited the station a few days later and found the visitor to be a yearling female and as eager to be noticed as any pet kitten. Though given the freedom of the bay, it always returned to its new home on being called and never at any time showed any disposition to return to the company of its fellow lions.

10. **Arctocephalus townsendi.** Guadalupe Fur Seal

That fur seals of some species were at one time abundant on most, if not all, of the islands of the peninsula, as well as those of California, cannot be disputed. There are undoubted records of many thousands of skins being taken from the Farallons and the islands south to Cape St. Lucas. At this time it is largely a matter of conjecture as to even the genus. During the fur seal controversy between England and the United States in 1892, Dr. Charles H. Townsend and the present writer visited Guadalupe Island in the hope of securing specimens of the fur seal said to have once existed there. The net result of our trip was four more or less broken skulls upon which was based a genus and species new to North America, *Arctocephalus townsendi.* In Dr. Townsend's report he mentions several living specimens as being seen but not taken. In the light of recent events, I have some doubts as to the animals seen were really fur seals; they may have been young California sea lions. The yearling Zalophus is quite easily mistaken under conditions such as we encountered, and though we may have seen Arctocephalus it is by no means certain. However, in 1893, there were said to have been 35 fur seals killed on Guadalupe and 15 the year following, the last being the final record, so far as I know, although I am of the opinion that a few were taken from year to year for some time. One of the chief objects of the voyage of the *Tecate* in 1922 was to secure all evidence possible as to the fur seal in the past and to ascertain if living animals were to be found.

On July 16 we examined the old rookery at Jacks Bay on the weather (west) side of the island, where the skulls of Arctocephalus were found in 1892. At this point we found a remarkably well defined rookery, marked by well polished rocks,

that at one time accommodated fully 30,000 adult seals. As is well known to those familiar with the habits of fur seals, they restrict themselves to certain limits, preferably a boulder-strewn beach, where in time—hundreds of generations perhaps—the rocks become polished and the rookery limits defined as sharply as if painted. A short distance inland from the rookery are eight stone huts, four of which were seemingly for storehouses and four for living quarters. The walls only are left, and it is evident that the roofs were of canvas or hides. Still further inland is an extensive area of land cleared of stones and, leading to it from the rookery, a walled driveway, the walls being of stones and palm logs—the cleared space being the killing and skinning grounds.

From the evidence obtainable, this was the work of Russians, who came from the north with Aleuts not less than 125 years ago. Not a bone or fragment is left of the many thousands of fur seals killed there in the past. At the south end of Guadalupe is a still larger rookery, estimated to have been populated by 30,000 or more. Here, as at Jacks Bay, are a number of stone walls marking the sites of storehouses and living quarters. On the beach above the rookery, the cleared area is marked by thousands of wooden pegs once in use to hold the skin stretched until dry enough to store for shipment. Many of the pegs today mark the outlines of what was a seal skin over 100 years ago, and so kindly have the elements treated the wood that there is scarcely any decay, but here, as at the northern rookery, no bones of Arctocephalus were found. A somewhat smaller fur seal rookery was found on the east side of the island, and it was estimated that at one time Guadalupe was populated by at least 100,000 fur seals, old and young.

I have knowledge of two fur seals being shot on the west San Benito in about the year 1890.

While the Guadalupe Fur Seal was resident to a far greater degree than its northern relative, there were periods each year for some two or three months when it left the islands and disappeared. Where it went the hunters were unable to tell me, nor can I even say at what time of the year it migrated. During a large part of the time it was found about the island. It inhabited the many caves found here, and there is a chance that

some such cave dwellers may have been overlooked at the time we were exploring the islands.

I find among the early records of the islands some very interesting notes on the fur seal, as the log of the *Port au Prince,* a whaler that sailed from England, February 12, 1805, and toucned at Cedros for a cargo of elephant seal oil. Leaving Cedros on August 23, she proceeded to the Benitos 15 miles west, where in 19 days, 8,338 fur seals were killed. The ship *Dromio,* out of Boston, arrived at "Shelvrocks Island" (Socorro) in November, 1808, and in two weeks killed 3,000 fur seals. Another early navigator states that as he found the northern islands—Santa Barbara Islands and those of Lower California—being sealed by the Russians, he proceeded to Socorro where, in a day's search he saw some 20 fur seals and 1,500 sea lions. The fur seal outlook not being inviting, the ship did not engage in that trade.

The fur seals of Guadalupe must have been commercially exterminated by the Russians early in the last century, for nothing seemed to have been known of them during the American occupation of California until about 1876, when they were accidentally discovered by a schooner from San Diego, and for a short time a profitable trade was enjoyed by a number of small craft. The curtain was rung down on the last act in 1894, when 15 were said to be the season's catch. We have authentic records of 5,575 being killed at Guadalupe and San Benito between 1876 and 1894. Whether there will be others in the years to come remains to be seen.

11. Phoca richardii geronimensis.

San Geronimo Harbor Seal

This species never was very abundant on the coast of Lower California, but a few were seen on the sand bars in San Quintin Bay. On San Roque Island, August 2, there were a dozen or more on the rocks. They seem to avoid the company of other species, and are more at home on the sand bars and mud flats of enclosed waters than the rocky shores and surf that seem to suit the requirements of Zalophus.

12. **Macrorhinus angustirostris.** Elephant Seal

The history of this most interesting species is filled with tragedy. Once it was abundant from the region of Santa Barbara to Magdalena Bay, some 800 miles of coast line. It became so reduced in numbers, due to extensive slaughter on the part of the early whalers who killed the animal for the oil, that as long ago as 1869, Scammon regarded it as "nearly, if not quite, extinct." Since that day naturalists have several times unexpectedly encountered a small family and, in killing them, have secured for science what they honestly looked upon as the last of the species. Although the taking of these last survivors was regarded as regrettable in the extreme, it was considered justified, on the grounds that the species was doomed to die at the hands of whalers or sealers, and museums were in need of the specimens.

The present condition of the remnant of the once abundant species speaks volumes for its ability to rebuild, if given opportunity. In 1911, Charles H. Townsend found 150 on the west side of Guadalupe, at the same hauling grounds where he and the present writer found nine in 1892,—of which seven were killed for the National Museum at Washington. On the return of Dr. Townsend's expedition, the newspapers of the coast featured the rediscovery of this strange creature in such manner that the public was led to think that the capture of one meant an independent fortune for the captor, and as a result to be expected the fishermen of southern California flocked to the spot to reap the harvest. It would be impossible to state how many were killed, but they were numerous and, needless to state, the specimens thus killed were of no value to museums. The Mexican Government, at this stage of the game, placed an embargo on the killing of elephant seals, and, for a time at least, the few living were given a respite.

In the winter of 1920-21, an enterprising whaler, hearing of the occurrence of the species on the coast of Lower California, outfitted for a cruise that was intended to bring their history to an end. Fortunately, however, it was supposed that the elephant seals were in the Gulf of California. Guadalupe

Island was not visited, and the voyage, from a commercial point, was a failure.

About the time plans were being made for the total extermination of this species by way of the whaler's try-pot, a company operating a fertilizer plant in California applied to Dr. Hanna, of the California Academy of Sciences, for information as to the whereabouts of the sea elephants, stating they wanted to use what were left for a few days' run of their plant. Needless to state, the information was not given, and while some cabbage field may have lost a temporary stimulant, the elephants were given another reprieve. In July, when the Guadalupe elephant beach was visited by our expedition, we found 264 animals hauled on the sand, 14 of which seemed to be young of the year and presumably there was an equal number of mothers. While the adult animals are quite fearless, even almost impossible to disturb to the extent of causing them to leave the beach, the pups were rather timid and before the disparity of sexes was noticed all the pups had gone to sea, and with them the females, leaving only the bulls to interview the intruding naturalists. At this date (July 12) the younger animals had seemingly finished the moult and were in a dark gray or blackish coat,—black when first emerging from the water. Most of the larger bulls were in a tattered, ragged condition, indicating the extreme moult, the neck and anterior parts of the body being hung with streamers of cuticle and hair, oftentimes several inches in length, hanging from pink or flesh-colored undersurface, suggesting a bad case of sunburn.

In moulting, not only is the hair renewed but the entire cuticle seems to be shed, the beach being strewn with patches of the old coat oftentimes as large as a man's hand. On examination of these detached patches of cuticle and pelage, it is difficult to tell at a glance which was the inner side, the hair extending 3 mm. beyond the cuticle on its inner surface and 10 mm. for the exterior measurement. The color is somewhat lighter on the flesh side as well. These animals with the old moulting coats were more or less uniform yellowish-tan, or what is generally recognized in the West as "buckskin" color, contrasting strongly with the darker—almost black—coats of

the younger males that had completed the moult. The pups that we assumed to be of the current year were about 175 pounds in weight, dark gray above, with an obscure mottling of the coat in certain lights, suggestive of the spots in the coloring of *Phoca richardii,* the upper coloring gradually fading to a very light gray—almost white—below.

A yearling size juvenile was estimated to be of about 500 pounds weight and, like the adults, uniform dark gray. In the adult female the coloring is similar, the only difference being in the almost total lack of the nasal development so characteristic of the adult male. In this respect they resemble quite closely the undeveloped males. A male elephant seal was shot for the Mexican collections and, though several shots were required to dispatch the animal, those 10 feet distant paid little or no attention to the disturbance. The stomach contents of this animal was a small amount of the volcanic sand of which the beach is composed.

In 1892 I found sand and pebbles the size of hens' eggs in the stomachs of those taken for the National Museum, and in only one was there any indication of the food—a fish, Sebastodes(?), of about one and one-half pounds, together with a few fronds of kelp that were doubtless unintentionally taken along with the fish, was taken from the stomach of one young male.

Before landing, the animals spend some time along the surf and it is quite possible that digestion is complete before they land. The stones and sand are no doubt taken from time to time in capturing their finny prey, and is not in any manner intentional. Similar matter has been reported as found in the stomachs of sea lions and fur seals, and has been mentioned as "ballast" that is taken by the seal before going into the water,—a story that should be classed with that of the hoop-snake.

An alarmed elephant seal will often "back up" at a pace exceeding that usually shown in advancing. This is accomplished by repeated, sudden jerking of the hind flippers and posterior part of the body, and is suggestive of the progress of a freshly

captured lobster. At times they will back down the beach and into the surf in this manner rather than turn and perhaps lose sight of the object that threatens. Upon coming out of the water, the adults leisurely crawled up to a point well above the tide, frequently pausing to rest, as if the effort were considerable. No use is made of the posterior limbs, the body being laboriously dragged along by action of the short but very powerful front flippers and the muscles of the abdomen, somewhat as an "inch worm" progresses. Finding a spot suited to its ideals, the animal usually proceeds to pitch sand over its back, using the front flippers as shovels until the upper parts are well sanded. The same shovels and lava sand also come in play as means of defence, for on several occasions when an animal was disturbed by members of our party a discharge of sand, sent with almost the force of bird shot, caused a hasty withdrawal. It was quite evident that the barrage was intended as a defence, for while the sand intended as a covering for the back is always tossed six or eight feet in the air, to land largely on the animal, when intended for the face of a man it was shot backward at a low angle, the seal looking back over the shoulder to note the effect and turning with surprising quickness to keep the intruder in range of its artillery.

The adult males are somewhat quarrelsome and, to judge by the battle-scarred necks and shoulders, indulge in some combats that are decidedly sanguinary. At the time of our visit, however, an armistice had been declared. Two bulls meeting often snapped at each other, raising the heads to a surprising height — eight feet or more, — mouth open and attitude threatening in the extreme, and such battles resulted in more threats. When challenging, the bulls often curved the flexible proboscis over into the wide open mouth until it must have been nearly at the base of the tongue. At such times they gave voice to the only sound I have heard, a loud gurgling roar, that might be compared to a much magnified snore. I have heard this note when half a mile or more from the animal. At times, also, the trunk is elevated and recurved until it points almost backward. At rest and in its normal position, it is withdrawn until it overhangs the mouth but little and rests

in two or three grotesque folds, extending back nearly to the eyes.

Estimating the number of female and immature elephant seals on the basis of the adult males we found on the beach in July, the entire Guadalupe herd should easily be 1,000 animals. There were over 300 adult males on the main beach on our return, July 16, and at the entrance to a large cave north of the beach we found 36 more, all males. The cave being all but closed by the high tide, we were unable to ascertain what might be inside. The Mexicans, however, on a subsequent visit to the island early in September, found "150 females and an equal number of pups about thirty inches in length inside the cave." If this information regarding the young is correct, those which we saw in July and considered as young of the year were about ten months old—as the pups of the California sea lion, Zalophus, are fully 30 inches in length at birth. There would seem to be something further needed in way of data before we definitely state that the animals seen were in fact Macrorhinus.

Several years ago there were a number of elephant seals captured at Guadalupe and taken to one of the amusement piers near Los Angeles, where for a time they were on exhibition. A storm destroyed the pier and the seals escaped. On two or three occasions the species has been reported from different points along the Santa Barbara Channel, and it is quite probable that it is the escapes that were seen. There may perhaps be a small breeding herd established at some of the outlying islands which, if protected, will in time re-establish the species in its old-time haunts among these islands.

For several years past a few elephant seals have been seen about the San Benito Islands, but it is certain that no colony has yet been established there. They have been seen in May and October and in sufficient numbers to indicate that more than a mere few might have wandered from the main herd. They no doubt in due time, if the present protection is enforced, will regain their lost rookeries on San Benito and Cedros. We found a number of badly weathered skulls on each of the above mentioned islands, where the whalers of 50 years or more ago had killed the animals for their oil.

The Mexican Government has recently designated both Guadalupe and Cedros islands as animal refuges, with a very heavy penalty for any infraction of the law. If the regulations are enforced, there is no doubt but the present species, as well as others, the future of which is in danger, may enjoy many more years of existence.

13. Peromyscus eremicus cedrosensis.

Cedros Island White-footed Mouse

Specimens are in the collections from each of the five stations made on Cedros Island. The species seemed to be rare in the interior, but very common along the beaches.

14. Peromyscus eremicus polypolius (?)

Margarita White-footed Mouse

Several Peromyscus were taken on Margarita Island, but all were so badly mutilated by ants that little could be learned of the external appearance. One specimen was seemingly of an almost uniform ashy or pearl gray, lighter below,—perhaps an albino.

15. Peromyscus maniculatus sonoriensis.

Sonoran White-footed Mouse

It is with some hesitation that I refer a single Peromyscus from San Quintin to this race. The specimen is immature and agrees in a general way with specimens from southern California of similar age, but the tail is much more sharply bicolor and the lower parts more decidedly white than any in the collection of the San Diego Society of Natural History.

16. Peromyscus maniculatus coolidgei.

Coolidge White-footed Mouse

At San Bartolome Bay two specimens were taken.

17. Peromyscus maniculatus geronimensis.

Ashy-gray White-footed Mouse

Very abundant on Natividad Island, the only station in its habitat at which we touched.

18. Peromyscus maniculatus cineritius.

San Roque White-footed Mouse

Very abundant on Asuncion Island. San Roque Island, the type locality of this subspecies, is but six or seven miles from Asuncion and with exactly similar conditions and environment. No traps were set on San Roque, so I am unable to make a direct comparison with specimens from that island. Specimens were sent to the American Museum of Natural History and compared with types by my son, H. E. Anthony, who states:

"Very close to *cineritius* of San Roque; belly a trifle whiter, hind feet seeming to lack dusky ankles of San Roque series. It is possible that the Asuncion animal is a slightly characterized subspecies of *maniculatus* distinct from *cineritius,* but a larger series of specimens from Asuncion as well as from San Roque is needed to establish this point. No apparent skull differences."

19. Peromyscus maniculatus magdalenæ.

Magdalena White-footed Mouse

Common on Magdalena Island.

20. Neotoma intermedia intermedia.

Intermediate Wood Rat

Common about San Quintin Bay.

21. Neotoma intermedia pretiosa.

Matancita Wood Rat

Quite common on both Magdalena and Margarita islands.

22. Neotoma bryanti.

Cedros Island Wood Rat

Neotoma were found more or less abundantly in all parts of Cedros Island, more common in the northern end and among the more broken parts of the island and rather scarce at the south end, where the land is lower and less suited to their requirements.

23. Epimys rattus alexandrinus.

Roof Rat

A specimen taken on the west side of San Quintin Bay opposite the settlement. At some time within the past two years a large steamer was wrecked on San Roque Island, evidently introducing rats at that point, as a dead Epimys was seen on the beach.

24. Mus musculus musculus.

House Mouse

Mice of this genus are more or less distributed over Guadalupe Island and, as they are more abundant in the sections adjacent to the fur-seal rookeries, it is not improbable that they were introduced by the Russians a century or more ago. A single immature mouse was shot at Jacks Bay on the west side of the island. If this specimen represents the normal color of the race at present found on Guadalupe, it is a very interesting illustration of evolution. The upper parts are a rich brown, several shades darker than any specimen in the collection of the San Diego Museum of Natural History; below, somewhat lighter. It will be better, however, to await further specimens before separating the race.

25. Perognathus helleri.

Heller's Pocket Mouse

The type of this species was taken at San Quintin, where pocket mice are quite common. For some reason they were

very hard to trap at the time of our visit, and but two were secured, both from the west side of the bay.

26. Perognathus penicillatus albulus.

Magdalena Island Pocket Mouse

At Magdalena Bay we found this race not uncommon, but owing to the ants destroying the specimens only two were secured in condition worth saving.

27. Perognathus anthonyi.

Anthony's Pocket Mouse

For the past quarter of a century this species has been represented by the single type in the collection of the Biological Survey, collected by the present writer at South Bay, Cedros Island. During the summer of 1922 we found the species rather commonly distributed over the island, from the sandy arroyos at the beach to the rocky hillsides nearly or quite, to the tops of the higher mountains. For some reason, this species was very difficult to secure in traps and only six specimens were taken. The series, however, shows a very interesting condition of moult, which is perhaps best expressed in Dr. Nelson's letter regarding the series:

"The specimens of Perognathus from Cedros Island have been compared with the type taken by you at South Bay many years ago. One of these from the west side of Cedros Island, like the others from South Bay, agrees closely with the type. These specimens in fresh pelage are, however, nearly throughout more blackish, less brownish, than the type, which is in a worn and somewhat faded pelage. In one of your examples, however, the pelage change is evidently progressive, beginning on the anterior part of the body. The brownish rump and hind legs still in worn pelage very closely resemble the faded pelage of the type, showing that the apparent difference in general color is only seasonal. These specimens of *Perognathus anthonyi* are of considerable interest, as up to the time of this second collection, the type had remained unique."

The work of this species so closely resembles the hills that mark the burrows of Thomomys that for many years I have felt certain that there was a species of that genus to be found on Cedros Island. Dr. Hanna, though experienced in collecting pocket gophers, was also misled by the many "dumps" along the gulches and it was not until we had dug into several of the burrows and unearthed a pocket mouse that we reluctantly agreed that we had been deceived.

28. Dipodomys merriami parvus.

San Bernardino Kangaroo Rat

Not uncommon at San Quintin. Three specimens.

29. Dipodomys platycephalus.

One night was devoted to the traps at Abreojos Point, but, though signs of Dipodomys were noted in several places, no specimens were taken. An owl pellet, which was found near the beach, contained the skull and bones of the above species.

30. Ammospermophilus leucurus peninsulæ.

Lower California Ground Squirrel

Common on the plain east of San Quintin, where two were secured, July 20.

31. Lepus californicus martirensis.

San Pedro Martir Jack Rabbit

Two jack rabbits taken at San Quintin in July are somewhat puzzling. If one is to judge from the coloring as given in Nelson's "Rabbits of North America," they would be classed as *martirensis,* to which form I have provisionally assigned them; though the measurements agree more closely to those of *bennettii.*

32. Lepus californicus magdalenæ.

Magdalena Island Jack Rabbit

On the west side of Margarita Island we found this strongly marked race rather common, but not easily collected owing to its keeping largely in the thick growth of underbrush found along this side of the island. A half-grown young was shot July 29.

33. Sylvilagus bachmani cinerascens.

Ash-colored Cottontail

A single specimen of the brush rabbit from San Quintin I have regarded as this race. There is nothing to distinguish it from specimens taken at San Diego, either in color or measurements, though the locality is well within the range of *exiguus* and considerably south of recorded capture of *cinerascens*.

34. Sylvilagus bachmani cerrosensis.

Cedros Island Cottontail

Two specimens of this species were secured from Cedros Island.

35. Odocoileus cerrosensis.

Cedros Island White-tailed Deer

We found this deer fairly common on Cedros Island, though since its discovery a quarter of a century ago it has been reduced to the point of extinction by mining operators that depended upon venison to furnish meat the year round for a large force of workmen. The last company working the mines at the north end of Cedros is said to have left several dogs that have multipled until at this date several large packs are roaming the island and killing many does and fawns. In August we secured several specimens and saw others.

36. **Antilocapra americana peninsularis.**

Lower California Antelope

Formerly quite abundant from San Quintin south to Turtle Bay, but reduced at this writing to but a remnant of its former numbers, due chiefly to hunters hired by American corporations operating mines and quarries within the range of the species. The only evidence we found was a horn, from a recently killed animal, at Abreojos Point.